PEER-REVIEW REPORT

Name of journal: *World Journal of Stem Cells*

Manuscript NO: 89420

Title: How mesenchymal stem cells transform into adipocytes: Overview of the current understanding of adipogenic differentiation

Provenance and peer review: Invited manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 05924658

Position: Peer Reviewer

Academic degree: N/A

Professional title: N/A

Reviewer's Country/Territory: Brazil

Author's Country/Territory: China

Manuscript submission date: 2023-10-31

Reviewer chosen by: AI Technique

Reviewer accepted review: 2023-11-04 12:21

Reviewer performed review: 2023-11-17 18:09

Review time: 13 Days and 5 Hours

Scientific quality	[ ] Grade A: Excellent [Y] Grade B: Very good [ ] Grade C: Good [ ] Grade D: Fair [ ] Grade E: Do not publish
Novelty of this manuscript	[ ] Grade A: Excellent [Y] Grade B: Good [ ] Grade C: Fair [ ] Grade D: No novelty
Creativity or innovation of this manuscript	[ ] Grade A: Excellent [Y] Grade B: Good [ ] Grade C: Fair [ ] Grade D: No creativity or innovation

Scientific significance of the conclusion in this manuscript	[　] Grade A: Excellent　　[Y] Grade B: Good　　　[　] Grade C: Fair [　] Grade D: No scientific significance
Language quality	[　] Grade A: Priority publishing　[Y] Grade B: Minor language polishing　[　] Grade C: A great deal of language polishing　[　] Grade D: Rejection
Conclusion	[　] Accept (High priority)　[　] Accept (General priority) [Y] Minor revision　[　] Major revision　[　] Rejection
Re-review	[　] Yes　[Y] No
Peer-reviewer statements	Peer-Review: [Y] Anonymous　[　] Onymous
	Conflicts-of-Interest: [　] Yes　[Y] No

SPECIFIC COMMENTS TO AUTHORS

The review is very comprehensive regarding the molecular mechanisms by which mesenchymal cells differentiate into adipogenic cells. The only thing I missed was the discussion on protocols for differentiating MSCs into adipocytes. I recommend a paragraph discussing this topic.

Scientific quality	[ ] Grade A: Excellent　[ ] Grade B: Very good　[Y] Grade C: Good [ ] Grade D: Fair　[ ] Grade E: Do not publish
Novelty of this manuscript	[ ] Grade A: Excellent　[Y] Grade B: Good　[ ] Grade C: Fair [ ] Grade D: No novelty
Creativity or innovation of this manuscript	[ ] Grade A: Excellent　[Y] Grade B: Good　[ ] Grade C: Fair [ ] Grade D: No creativity or innovation

Scientific significance of the conclusion in this manuscript	[ ] Grade A: Excellent [Y] Grade B: Good [ ] Grade C: Fair [ ] Grade D: No scientific significance
Language quality	[ ] Grade A: Priority publishing [Y] Grade B: Minor language polishing [ ] Grade C: A great deal of language polishing [ ] Grade D: Rejection
Conclusion	[ ] Accept (High priority) [ ] Accept (General priority) [Y] Minor revision [ ] Major revision [ ] Rejection
Re-review	[ ] Yes [Y] No
Peer-reviewer statements	Peer-Review: [Y] Anonymous [ ] Onymous
	Conflicts-of-Interest: [ ] Yes [Y] No

SPECIFIC COMMENTS TO AUTHORS

The theme of this review article is to explore in detail the differentiation of MSCs towards adipocytes, to describe the biological regulatory pathways behind this phenomenon, and to provide readers with therapeutic insights. The characteristic phenotypic markers of MSCs and the prominent signaling pathways of adipocyte-directed differentiation are correctly described. The roles of actin/Rho, TGF-beta/SMAD, and BMP signaling pathways are summarized in a detailed and understandably correct manner. They also summarize in detail the role of noncoding RNAs based on the most recent literature. The crucial aspects of the DNA methylation and acetylation/deacetylation processes are also summarized in a correct manner. The figures are illustrative and help to interpret what is described in the text. In the case of therapeutic options, I suggest expanding the description to autoimmune diseases, osteogenesis, and cancer, as there is a role for the MSC-adipocyte lineage in these pathologies as well. The use of English grammar is appropriate.